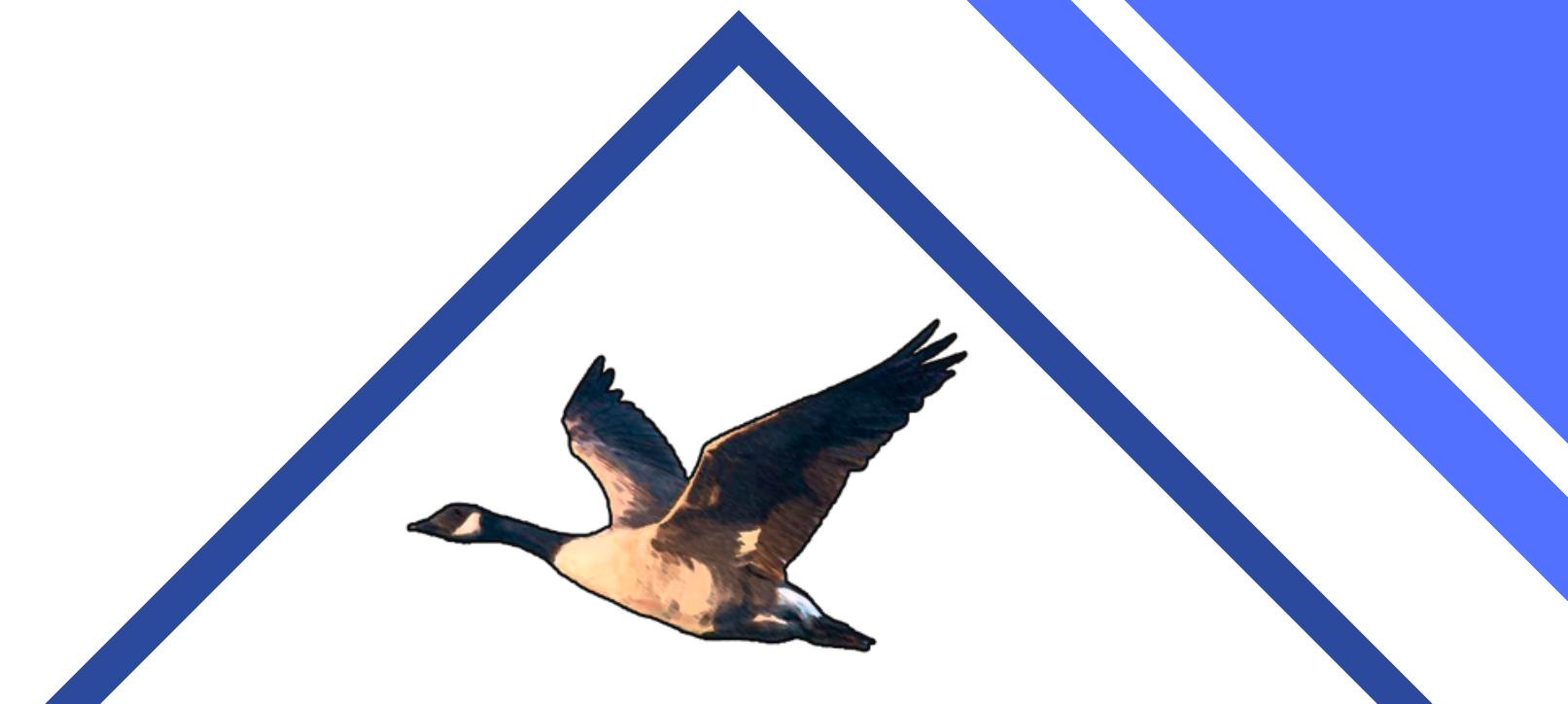


PROYECTO ML

CORDERO HERNÁNDEZ, MARCO RICARDO
RODRÍGUEZ CASTRO, CARLOS EDUARDO

PRESENTACIÓN ORIGINAL



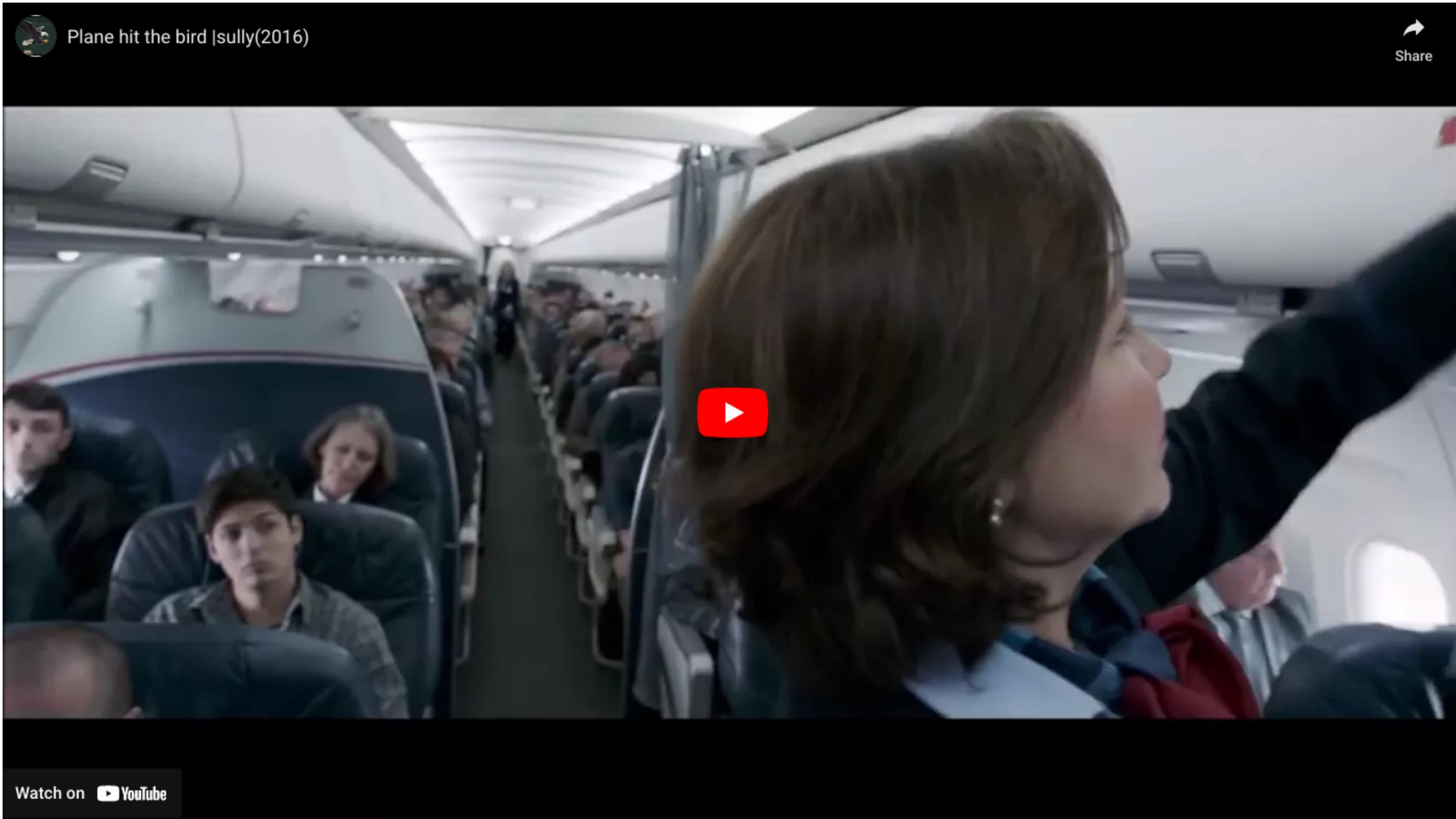
PROBLEMA

PREDICCIÓN DE FATALIDAD
EN COLISIONES DE AVES EN
CONTRA DE AERONAVES

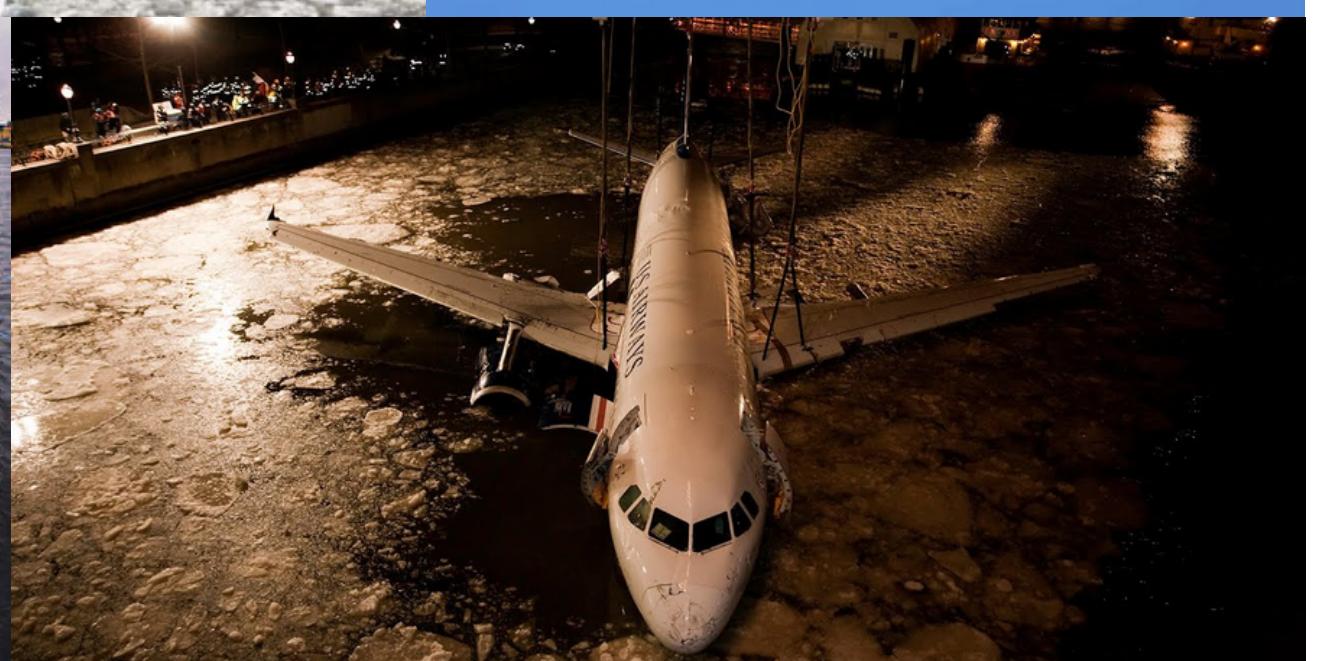


DEMOSTRACIÓN

[Link a video](#)



DEMOSTRACIÓN



DATOS DEL INCIDENTE



15 DE ENERO DEL 2009
VUELO 1549 DE US AIRWAYS
AIRBUS A320
155 PERSONAS A BORDO

- Impacto con gansos canadienses
- Todas las personas fueron rescatadas
- Hubo solamente una persona herida

Resultado: **POSITIVO**

EJEMPLO ADICIONAL

*04 DE ENERO DEL 2009
SIKORSKY S-76C++ N748P
9 PERSONAS A BORDO*

- Impacto con un ratonero de cola roja
- 8 de las 9 personas fallecieron
- Un sobreviviente quedó gravemente herido

Resultado: **NEGATIVO**



PROBLEMA Y DESARROLLO



1

- ¿POR QUÉ ES RELEVANTE?
- ¿A QUIÉN BENEFICIA?

2

- DESCRIPCIÓN DEL DATASET
- VISUALIZACIÓN

3

- MODELOS
- COMPARATIVA

Motivación

1

COSTOS OPERATIVOS

Se estima que este tipo de accidentes le cuestan a las aerolíneas mundiales al rededor de \$1.2 billones anualmente

2

PREVENCIÓN DE FATALIDADES

Situaciones como esta son inusuales, pero cuando suceden, usualmente no se sabe actuar debidamente

3

MEJORA EN LOS DISEÑOS

Según los datos recabados, se pueden realizar mejoras a las partes de las aeronaves en donde se analice más daño (survivorship bias)



DATASET

2000-2011 BIRDS STRIKES PLANES

```
# Dataset info
ds_bst.info()

<class 'pandas.core.frame.DataFrame'
RangeIndex: 25558 entries, 0 to 25557
Data columns (total 26 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   record_id        25558 non-null   int64  
 1   aircraft_type    25558 non-null   object  
 2   airport_name     25558 non-null   object  
 3   altitude_bin     25558 non-null   object  
 4   aircraft_make_model 25558 non-null   object  
 5   wildlife_number_struck 25558 non-null   object  
 6   wildlife_number_struck_actual 25558 non-null   int64  
 7   effect_impact_to_flight 25558 non-null   object  
 8   flightdate        25558 non-null   object  
 9   effect_indicated_damage 25558 non-null   object  
 10  aircraft_number_of_engines 25290 non-null   float64 
 11  aircraft_airline_operator 25558 non-null   object  
 12  origin_state      25109 non-null   object  
 13  when_phase_of_flight 25558 non-null   object  
 14  conditions_precipitation 25558 non-null   object  
 15  remains_of_wildlife_collected 25558 non-null   bool   
 16  remains_of_wildlife_sent_to_smithsonian 25558 non-null   bool   
 17  remarks           20787 non-null   object  
 18  wildlife_size     25558 non-null   object  
 19  conditions_sky    25558 non-null   object  
 20  wildlife_species  25558 non-null   object  
 21  pilot_warned_of_birds_or_wildlife 25558 non-null   bool   
 22  cost_total         25558 non-null   int64  
 23  feet_above_ground 25558 non-null   int64  
 24  number_of_people_injured 25558 non-null   int64  
 25  is_aircraft_large 25558 non-null   bool  
dtypes: bool(4), float64(1), int64(5), object(16)
```



data.world

2000-2011 Birds Strikes Planes - dataset by shihzy

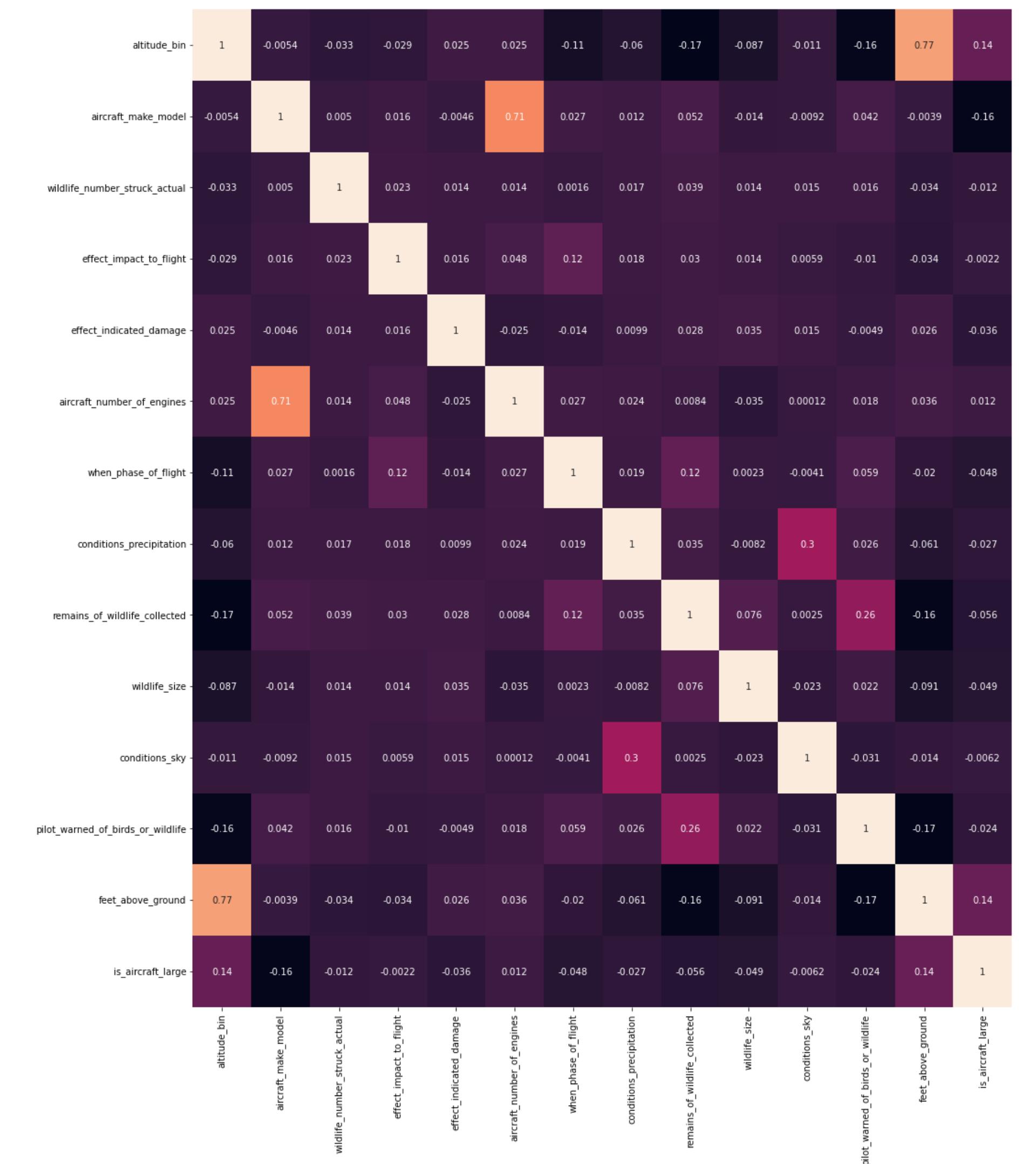
From 2000-2011, the FAA released the number of incidents where birds have struck a plane.

 data.world / Jul 29, 2016

ds_bst.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25558 entries, 0 to 25557
Data columns (total 14 columns):
 #   Column          Non-Null Count  Dtype  
--- 
 0   altitude_bin    25558 non-null   int64  
 1   aircraft_make_model  25558 non-null   int64  
 2   wildlife_number_struck_actual  25558 non-null   int64  
 3   effect_impact_to_flight    25558 non-null   int64  
 4   effect_indicated_damage  25558 non-null   int64  
 5   aircraft_number_of_engines 25558 non-null   float64 
 6   when_phase_of_flight    25558 non-null   int64  
 7   conditions_precipitation 25558 non-null   int64  
 8   remains_of_wildlife_collected 25558 non-null   int64  
 9   wildlife_size        25558 non-null   int64  
 10  conditions_sky       25558 non-null   int64  
 11  pilot_warned_of_birds_or_wildlife 25558 non-null   int64  
 12  feet_above_ground    25558 non-null   int64  
 13  is_aircraft_large    25558 non-null   int64  
dtypes: float64(1), int64(13)
```

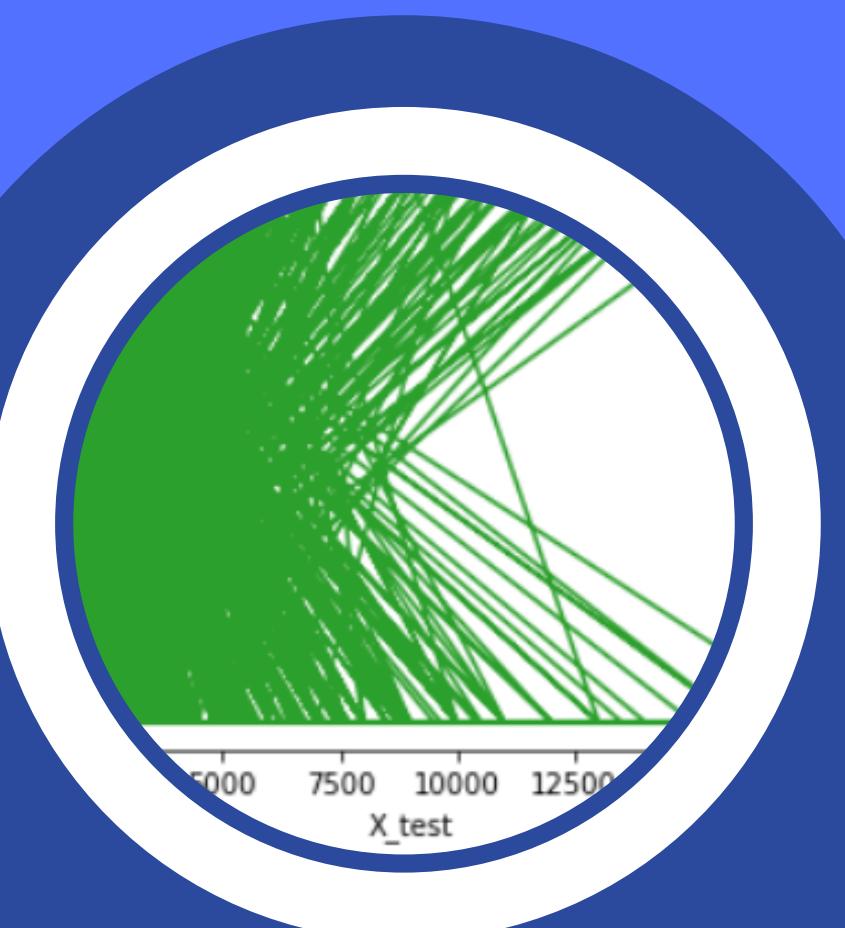
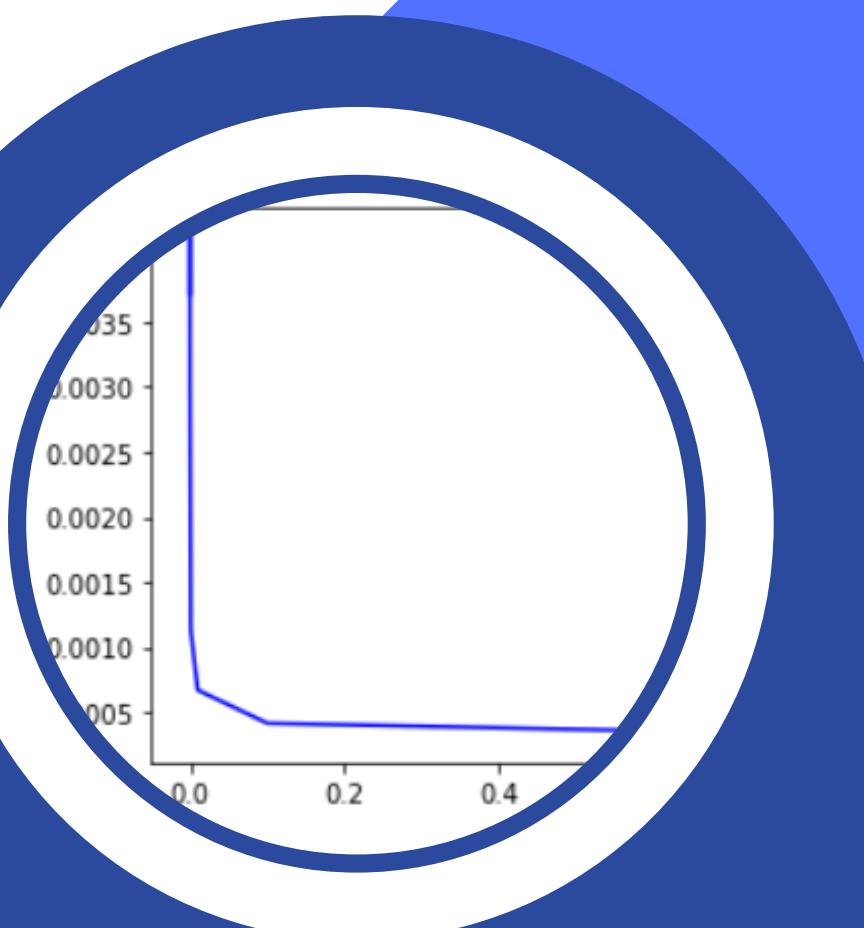
#	Column	Non-Null Count	Dtype
0	altitude_bin	25558 non-null	int64
1	aircraft_make_model	25558 non-null	int64
2	wildlife_number_struck_actual	25558 non-null	int64
3	effect_impact_to_flight	25558 non-null	int64
4	effect_indicated_damage	25558 non-null	int64
5	aircraft_number_of_engines	25558 non-null	float64
6	when_phase_of_flight	25558 non-null	int64
7	conditions_precipitation	25558 non-null	int64
8	remains_of_wildlife_collected	25558 non-null	int64
9	wildlife_size	25558 non-null	int64
10	conditions_sky	25558 non-null	int64
11	pilot_warned_of_birds_or_wildlife	25558 non-null	int64
12	feet_above_ground	25558 non-null	int64
13	is_aircraft_large	25558 non-null	int64



MODELOS

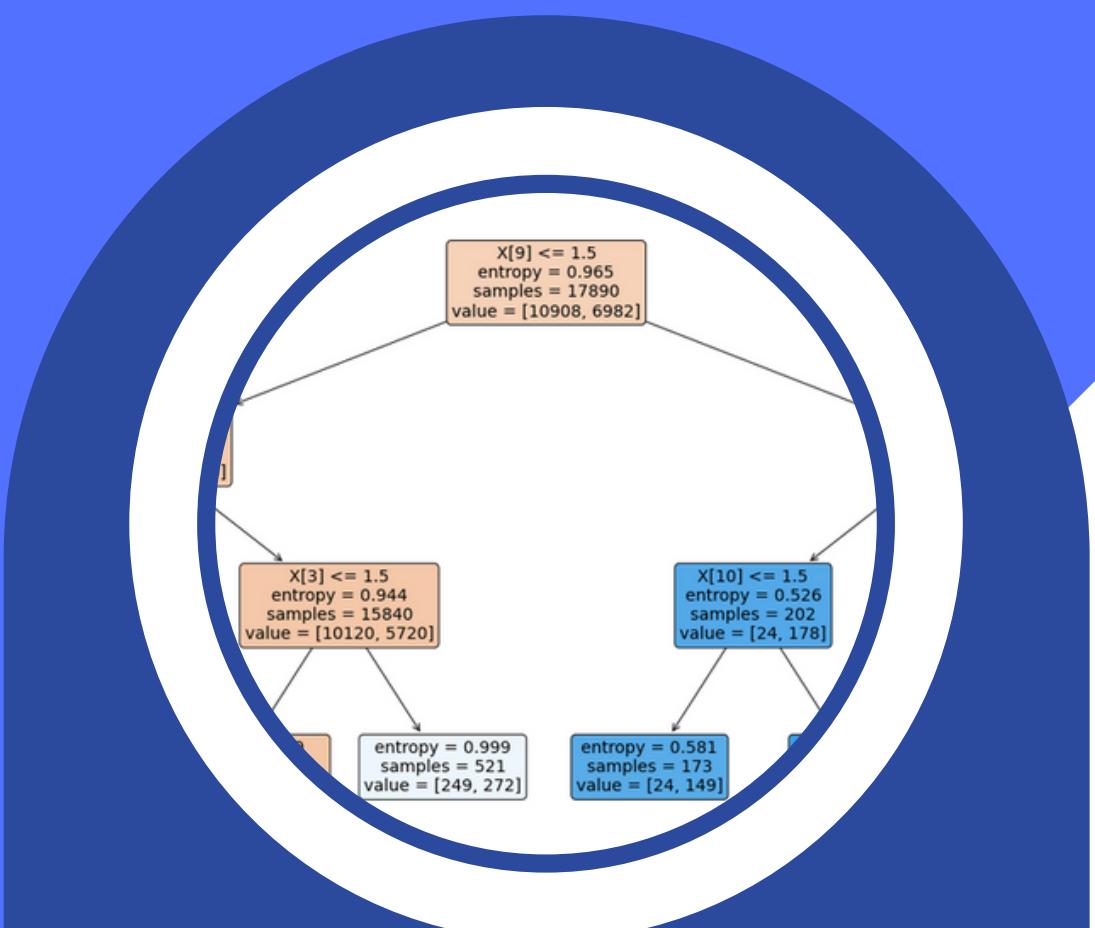
REGRESIÓN
LINEAL

Normal



RED
NEURONAL

Múltiples neuronas



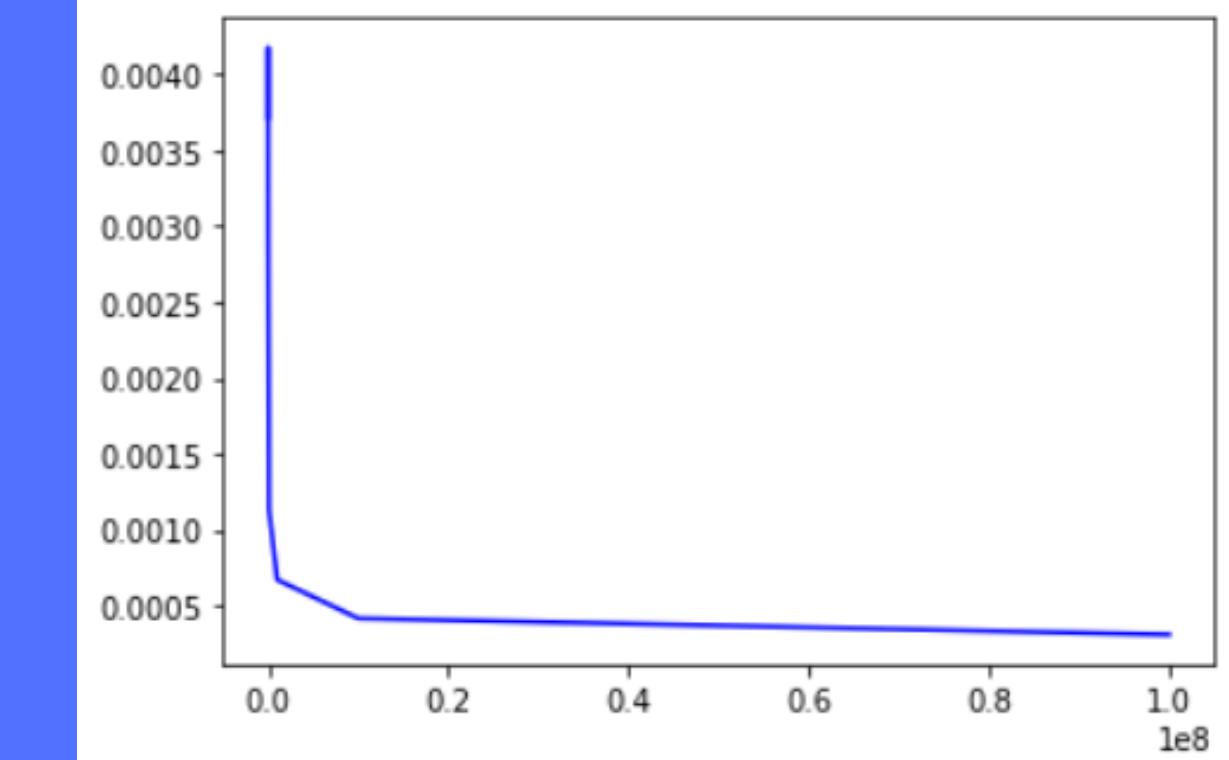
ÁRBOLES DE
DECISIÓN

Gini y Entropía

1

REGRESIÓN LINEAL

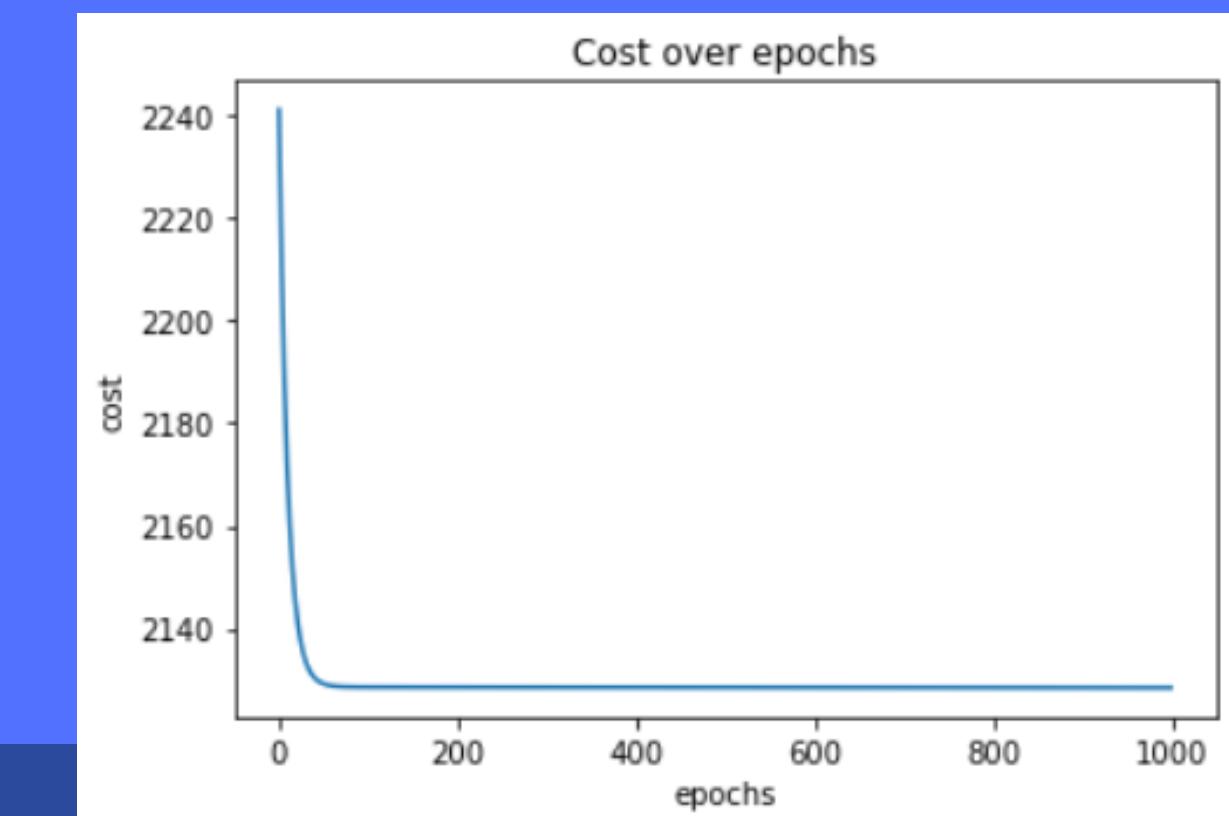
Se logró amortizar el costo al punto de obtener 0.0037144588612371132



2

REDES NEURONALES

Se aumentó el número de neuronas para obtener mejor precisión



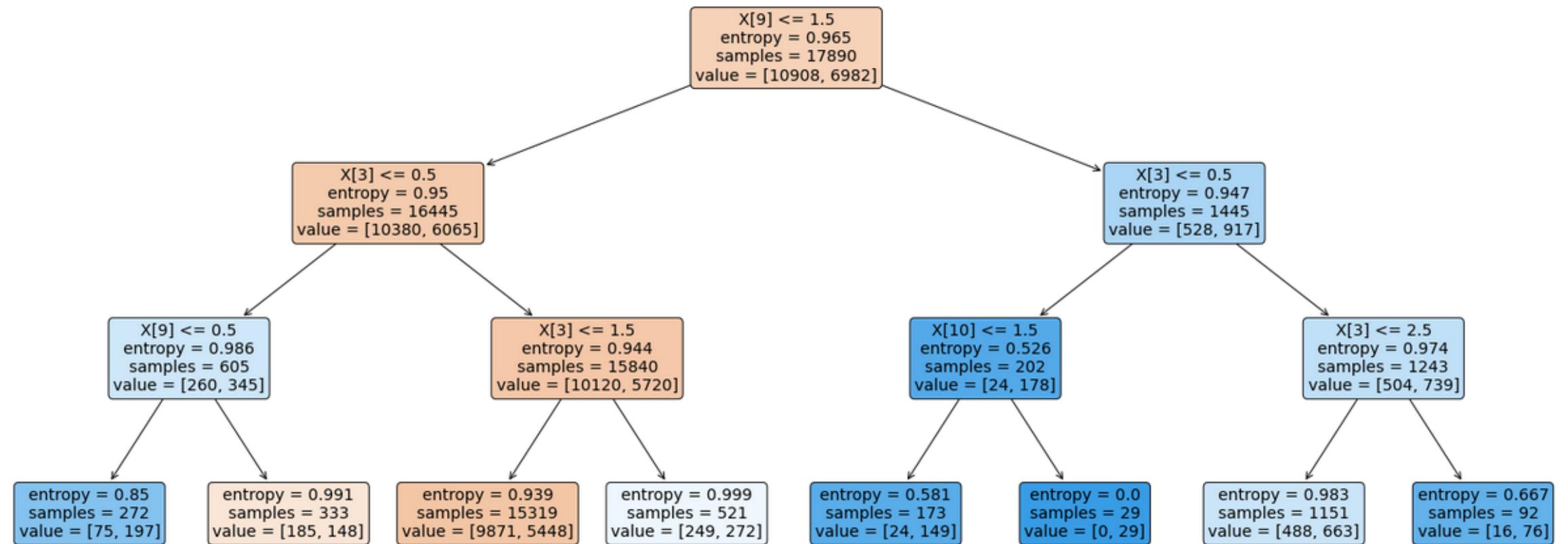
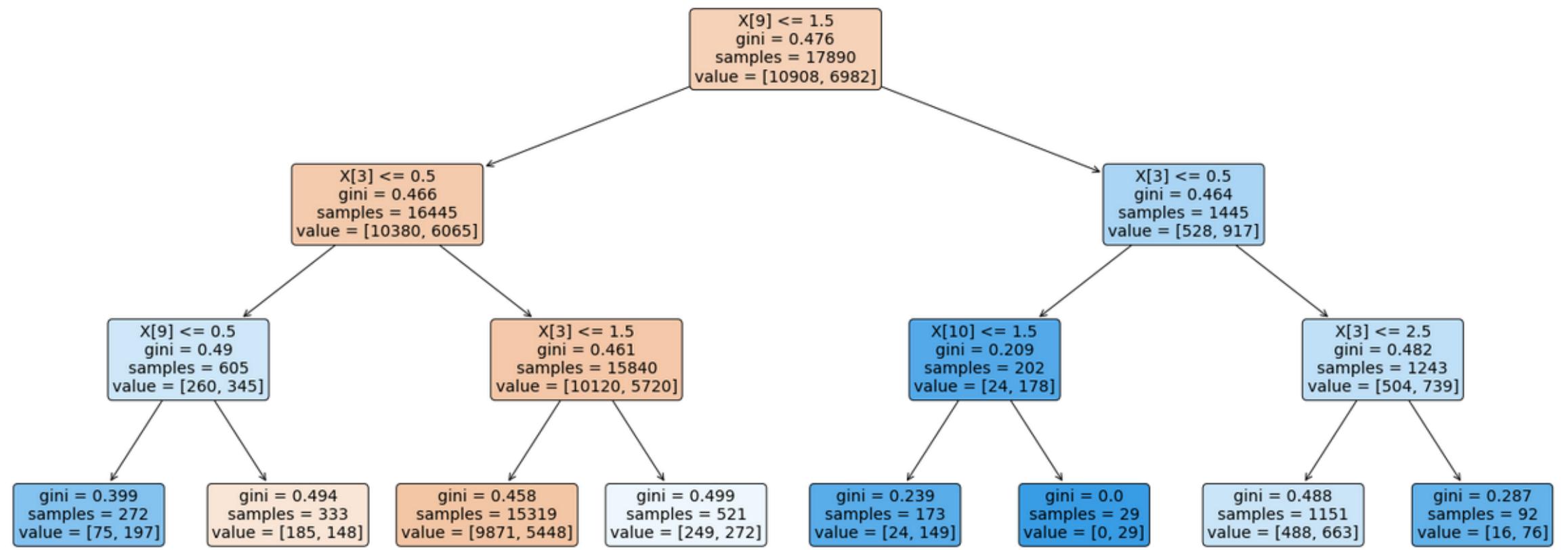
3

ÁRBOLES DE DECISIÓN

Modificación de criterio

Test matrices
[[4309 356]
 [2455 548]]

[[4309 356]
 [2455 548]]



CONCLUSIONES



CON
REFINACIONES
ESPECÍFICAS Y
DETALLADAS,
ESTE MODELO
PUEDE
IMPLEMENTARSE
EN AERONAVES
REALES COMO
MEDIDA
PREVENTIVA

Modelo ideal
*REGRESIÓN
LINEAL*

